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The Spider (Araneae) fauna of the cotton fields located in the western part of Turkey

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Abstract

In this study, the spider (Araneae) fauna of cotton (*Gossypium hirsutum* Linnaeus) fields located in the western part of Turkey was studied. The spiders were collected from the ground and field zones. The aspirator and the whole plant bag sampling technique were used in the collection. A total of 613 spiders were obtained from eight cotton fields during the period of July-September in 1997 and 1998. Fourty one species belonging to 31 genera and 12 families were determined. Numerically, Lycosidae was the dominant family, representing 29.0 % of all spiders collected, and *Pardosa proxima* (C.L.Koch) the dominant species, representing 21.1 % of the adult specimens. The four most common spider families were Lycosidae, Linyphiidae, Salticidae and Philodromidae.

Key Words: Araneae, cotton, fauna, Turkey, spiders.

Introduction

Natural living areas and agricultural ecosystems are important habitats for spiders. The ecological and faunistic studies which have been done on agricultural ecosystems showed that spiders are important agents in the pest control. For this reason, spiders in the agroecosystem have been the subject of numerous studies (Luczak, 1975, 1979; Nyffeler, 1982; Riechert & Lockley, 1984; Ruzicka, 1986; Clausen, 1986; Mansour, 1987; Sunderland, 1987; Nyffeler & Benz, 1987, 1988). Recently, a great deal of research has been undertaken to study the spider fauna of cereals such as soybean (Ferguson *et al.*, 1984), winter wheat (Jones, 1976; Sunderland, 1987), paddy (Zheng *et al.*, 1985) or alfalfa (Yeargan & Dondale, 1974), tobacco (Bayram *et al.*, 1998) and cotton fields (Leigh & Hunter, 1969; Mansour, 1987; Van den Berg *et al.*, 1990).

The present study constitutes an attempt to study the spider fauna of the cotton fields located in the western part of Turkey.

Material and Methods

1. Study area :

This study was performed on cotton fields located in the Aegean Region of Turkey in 1997 and 1998 (Fig. 1). The field work was started in early June and stopped in late September of each year. Eight cotton fields were investigated in the provinces of Manisa, İzmir and Aydın. Four fields are located in the vicinity of Saruhanlı (Manisa, *Field1=3 km east of Saruhanlı, about 25 acres; F2=8 km north of Saruhanlı, about 60 acres; F3=6 km west of Saruhanlı, about 30 acres; F4=5 km south of Saruhanlı, about 20 acres*), one field is located in the vicinity of Kemalpaşa (İzmir, *F5=5 km east of Kemalpaşa, on the Armutlu road, about 40 acres*), one field is located in the vicinity of Ödemiş (İzmir, *F6=2 km west of Ödemiş, on the Seyrekli road, about 30 acres*), one field is located in the vicinity of Nazilli (Aydın, *F7=10 km west of Nazilli, on the Aydın road, about 30 acres*), and one field is located in the vicinity of Söke (Aydın, *F8=5 km southeast of Söke, on the Bağarasi road, about 60 acres*). The cotton fields were surrounded by abandoned grasslands, wheat fields, tobacco fields or another cotton fields or hedgerows.

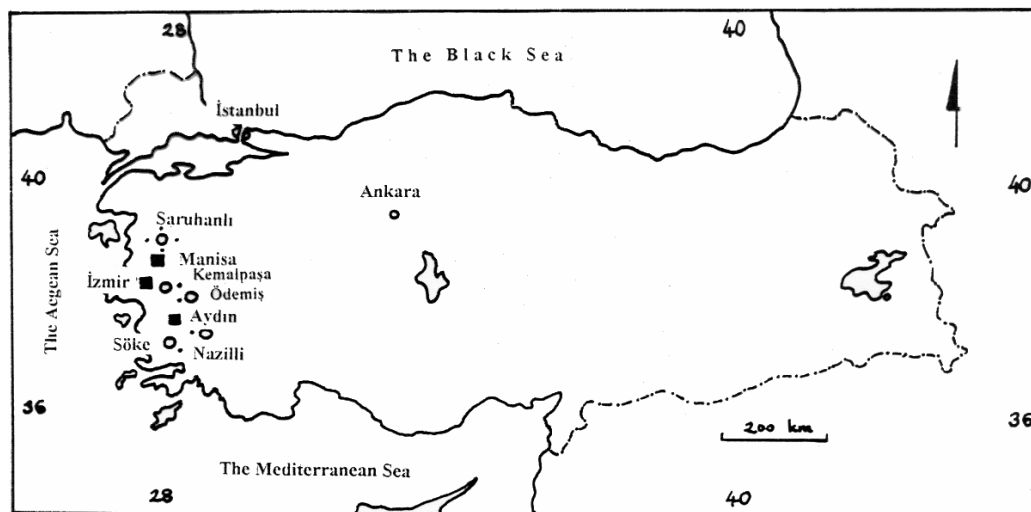


Fig. 1: The locations of the cotton fields where spiders collected in the Aegean Region of Turkey.

2. Climate :

The study area is in the range of the Mediterranean climate. The summer is hot and dry, and the winter is moderate and rainy. The hottest month is August (for instance, the average monthly temperature is 27°C in Kemalpaşa, and 28°C in Ödemiş), and the coldest month is January. In this area, the average annual temperature does not fall under 16°C. The average annual rainfall ranges between 700 and 1200 mm. Natural vegetation of the area is maquis. This area has got an important role in the agricultural development of Turkey.

3. Sampling techniques :

Four collections were made in each field (one a month) in each year. The spiders were collected from the vegetation and ground surface with aspirator. However, the Whole Plant Bag Sampling (WPBS) technique was used as well. About ten cotton plants were taken from each field in each collection. In the plant bag samplings, the plants were chosen at random. The transparent polithene bag (70 cm wide x 120 cm long) was pulled over the plant chosen, and the lower open mouth of the bag was tied around the stem of the plant with a string. Then the stem of the plant was cut off with a vineyard knife below the tied area, and the bag was labelled and the whole plant removed to the laboratory. In the laboratory, the plants inside their bags were placed in a deep-freezer to immobilize the spiders and insects. Then the plants were thoroughly searched, the spiders were collected with aspirator, and placed in glass tubes

containing 70 % alcohol. The spiders collected with aspirator during the field work were taken directly to the alcohol tubes. All sampling was done during the day-time. The laboratory work was carried out at the Zoological Research Center in Kırıkkale University. A total of 613 spiders were investigated during this study. The species, sex and stage of development of each specimen were recorded. Taxonomic determinations of the spiders were made with a Nikon AFX-MX model stereo binocular microscope. The juvenile spiders were identified to the family level only. All the adult spiders collected were deposited in the Zoological Research Center in Kırıkkale University.

Results and Discussion

During the four month collecting period for 1997 and 1998, a total of 613 spiders were collected. The spiders collected representing 12 families (Tables 1,2), 31 genera and 41 species. The collection was made in cotton fields located in Manisa, İzmir and Aydın provinces, in the western part of Turkey. Species numbers, individual numbers according to sex and stage, total numbers and percentage of each family are given in Table 1.

Table 1. Spider families collected from the cotton fields: Species numbers, individual numbers according to sex and stage, total numbers and percentage of each family

F a m i l y	Species Number	Male	Female	Adult	Immature	Total	%
Lycosidae	8	41	75	116	62	178	29.03
Linyphiidae	8	17	46	63	33	96	15.66
Salticidae	5	21	26	47	36	83	13.53
Philodromidae	3	13	20	33	35	68	11.09
Thomisidae	4	7	13	20	45	65	10.60
Gnaphosidae	4	14	12	26	23	49	7.99
Theridiidae	3	15	7	22	15	37	6.03
Oxyopidae	2	1	3	4	7	11	1.79
Amaurobiidae	1	0	2	2	9	11	1.79
Pisauridae	1	2	4	6	4	10	1.63
Araneidae	2	0	2	2	2	4	0.65
Hahniidae	-	0	0	0	1	1	0.16
Total	41	131	210	341	272	613	--
%	--	38.4	61.6	55.6	44.4	--	--

In this study, the most encountered spiders were wolf-spiders (Lycosidae, 29.03 %); followed by linyphiids (15.66 %) and salticids (13.53 %). Among these spiders lycosids were mostly collected from the ground surface and vegetation zone under 15 cm in height ("the ground zone", Duffey, 1966). However, some lycosids were captured from the upper part of the cotton plants as well. Most of the money spiders (linyphiids) were collected from the "field zone". On contrary, some of them were taken from the ground zone. Most of the salticid spiders were found on the leaves. The philodromid (11.09 %) and thomisid (10.60 %) spiders were collected from the two zones. Spiders belong to other families were captured in low percentages (under 10 percent). Of these, the gnaphosids were mostly found on soil surface. The theridiids were collected from the webs either in the field zone or the ground zone.

The species recorded from the cotton fields (arranged according to caught number of individuals) are as in the following :

Lycosidae: *Pardosa proxima* (C.L.Koch, 1847), *Pardosa morosa* (L.Koch, 1870), *Pardosa amentata* (Clerck, 1757), *Pardosa hortensis* (Thorell, 1872), *Pardosa pullata* (Clerck, 1757), *Alopecosa pulverulenta* (Clerck, 1757), *Trochosa ruricola* (De Geer, 1778), *Arctosa perita* Latreille, 1799. **Linyphiidae:** *Walckenaeria atrotibialis* (O.P.-Cambridge, 1878), *Lepthyphantes leprosus* (Ohlert, 1865), *Lessertia denticelis* (Simon, 1884), *Linyphia triangularis* (Clerck, 1757), *Neriere furtiva* (O.P.-Cambridge, 1870), *Taranucnus setosus* (O.P.-Cambridge, 1863), *Erigone dentipalpis* (Wider, 1834), *Lepthyphantes tenuis* (Blackwall, 1852). **Salticidae:** *Salticus scenicus* (Clerck, 1757), *Phlegra fasciata* (Hahn, 1826), *Marpissa nivoyi* (Lucas, 1846), *Evarcha falcata* (Clerck, 1757), *Synageles dalmaticus* (Keyserling, 1863). **Philodromidae:** *Tibellus oblongus* (Walckenaer, 1802), *Thanatus formicinus* (Clerck, 1757), *Thanatus striatus* C.L.Koch, 1845. **Thomisidae:** *Xysticus cristatus* (Clerck, 1757), *Thomisus onustus* Walckenaer, 1806, *Xysticus robustus* (Hahn, 1831), *Xysticus bifasciatus* C.L.Koch, 1837. **Gnaphosidae:** *Haplodrassus signifer* (C.L.Koch, 1839), *Gnaphosa lugubris* (C.L.Koch, 1839), *Drassyllus pusillus* (C.L.Koch, 1833), *Aphantaulax seminigra* Simon, 1878. **Theridiidae:** *Steatoda bipunctata* (Linnaeus, 1758), *Steatoda albomaculata* (De Geer, 1778), *Euryopis flavomaculata* (C.L.Koch, 1836). **Oxyopidae:** *Oxyopes lineatus* Latreille, 1806, *Oxyopes nigripalpis* Kulczyński, 1907. **Amaurobiidae:** *Callobius claustrarius* (Hahn, 1833). **Pisauridae:**

Table 2. List of the species recorded from the cotton fields according to the caught numbers.

S p e c i e s	Male	Female	Total
1. <i>Pardosa proxima</i> (Lycosidae)	22	50	72
2. <i>Salticus scenicus</i> (Salticidae)	19	17	36
3. <i>Walckenaeria atrotibialis</i> (Linyphiidae)	7	18	25
4. <i>Tibellus oblongus</i> (Philodromidae)	10	9	19
5. <i>Thanatus formicinus</i> (Philodromidae)	2	11	13
6. <i>Pardosa morosa</i> (Lycosidae)	6	5	11
7. <i>Xysticus cristatus</i> (Thomisidae)	4	7	11
8. <i>Steatoda bipunctata</i> (Theridiidae)	8	3	11
9. <i>Pardosa amentata</i> (Lycosidae)	6	4	10
10. <i>Steatoda albomaculata</i> (Theridiidae)	6	4	10
11. <i>Lepthyphantes leprosus</i> (Linyphiidae)	0	9	9
12. <i>Haplodrassus signifer</i> (Gnaphosidae)	6	3	9
13. <i>Gnaphosa lugubris</i> (Gnaphosidae)	3	5	8
14. <i>Drassyllus pusillus</i> (Gnaphosidae)	5	3	8
15. <i>Pardosa hortensis</i> (Lycosidae)	4	3	7
16. <i>Lessertia dentichelis</i> (Linyphiidae)	0	7	7
17. <i>Linyphia triangularis</i> (Linyphiidae)	4	2	6
18. <i>Pardosa pullata</i> (Lycosidae)	2	4	6
19. <i>Pisaura mirabilis</i> (Pisauridae)	2	4	6
20. <i>Thomisus onustus</i> (Thomisidae)	2	3	5
21. <i>Nerienne furtiva</i> (Linyphiidae)	5	0	5
22. <i>Alopecosa pulverulenta</i> (Lycosidae)	0	4	4
23. <i>Trochosa ruricola</i> (Lycosidae)	1	3	4
24. <i>Taranucnus setosus</i> (Linyphiidae)	1	3	4
25. <i>Erigone dentipalpis</i> (Linyphiidae)	0	4	4
26. <i>Phlegra fasciata</i> (Salticidae)	1	3	4
27. <i>Marpissa nivoyi</i> (Salticidae)	1	2	3
28. <i>Evarcha falcata</i> (Salticidae)	0	3	3
29. <i>Lepthyphantes tenuis</i> (Linyphiidae)	0	3	3
30. <i>Oxyopes lineaus</i> (Oxyopidae)	1	2	3
31. <i>Xysticus robustus</i> (Thomisidae)	1	2	3
32. <i>Arctosa perita</i> (Lycosidae)	0	2	2
33. <i>Callobius claustrarius</i> (Amaurobiidae)	0	2	2
34. <i>Xysticus bifasciatus</i> (Thomisidae)	0	1	1
35. <i>Synageles dalmaticus</i> (Salticidae)	0	1	1
36. <i>Thanatus striatus</i> (Philodromidae)	1	0	1
37. <i>Aphantaulax seminigra</i> (Gnaphosidae)	0	1	1
38. <i>Euryopsis flavomaculata</i> (Theridiidae)	1	0	1
39. <i>Oxyopes nigripalpis</i> (Oxyopidae)	0	1	1
40. <i>Araneus quadratus</i> (Araneidae)	0	1	1
41. <i>Argiope lobata</i> (Araneidae)	0	1	1
T o t a l	131	210	341

Pisaura mirabilis (Clerck, 1757). **Araneidae:** *Araneus quadratus* Clerck, 1757, *Argiope lobata* (Pallas, 1772). **Hahniidae:** unidentifiable immature individual.

Among these species, *Pardosa morosa* (L.Koch) (Lycosidae), *Taranucnus setosus* (O.P.-Cambridge), *Lepthyphantes tenuis* (Blackwall), *Linyphia triangularis* (Clerck) (Linyphiidae), *Gnaphosa lugubris* (C.L.Koch), *Euryopis flavomaculata* (C.L.Koch) (Theridiidae), *Marpissa nivoyi* (Lucas) (Salticidae) and *Callobius claustrarius* (Hahn) (Amaurobiidae) are new records for the Turkish spider fauna.

Pardosa proxima was the most encountered species (21.1 %) among the recorded spiders from the cotton fields. *Salticus scenicus* took the second row (10.5 %), and followed by *Walckenaeria atrotibialis* (7.3 %), *Tibellus oblongus* (5.6 %), *Thanatus formicinus* (3.8 %), *Pardosa morosa* (3.2 %), *Xysticus cristatus* (3.2 %), *Steatoda bipunctata* (3.2 %), respectively (Table 2). The other species were represented by lower percentages.

In the studies which have been done in terrestrial ecosystems by our team so far, the wolf spiders were more or less the most encountered spiders. Even they were found as dominant spiders among the ground-zone spiders (Bayram, 1993; Bayram & Luff, 1993; Bayram & Allahverdi, 1994; Bayram, 1994; Bayram *et al.*, 1998; Bayram & Varol, 1999; Bayram *et al.*, *in press*). These findings fit with some other records (Yeargan & Dondale, 1974; Nyffeler & Benz 1987, 1988). However, among the field-zone spiders the linyphiids, salticids, philodromids and thomisids were more encountered. In this work, the vegetation zone spiders such as linyphiids could be dominant if the whole plant bag sampling technique had heavily been used. Of course, the catch numbers of the philodromid, thomisid, theridiid and araneid spiders would be perhaps higher. Likewise in the works of Van den Berg *et al.* (1990) and Mansour (1987), the spiders such as araneids, dictynids, linyphiids, clubionids and gnaphosids took place in the upper rows. On the other hand, especially day active spiders were collected in this work. In order to collect the nocturnal spiders, the pitfall traps should be used as well in the cotton fields. Consequently, to investigate the spider fauna of cotton fields in a better way the combination of the methods of aspirator sampling, whole plant bag sampling and pitfall trapping may be more effective.

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The first landmark in the route of Egyptian Arachnology : "*Explication Sommaire des Planches d'Arachnides de l'Égypte et de la Syrie*" (1825)

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Introduction

The first scientific record of a spider species from Egypt was that of Linnaeus (1758) in his 10th edition of "Systema Naturae" Tomus I. Regnum Animale. p.622 where he described, in a few words, the species *Aranea flavissima* : "A. abdomine oblongo flavissimo lævi. M. L. U. Habitat in Ægypto. Hasselqvist. Thorax fulvus. Pedes glabri." = "Spider with a light yellowish oblong abdomen. M. L. U. (Coll. S : æ Lovisæ Ulricæ Reginæ Museum) Habitat in Egypt. F. Hasselquist, 1749. Thorax deep yellow. Legs smooth." A brief description which is not enough to identify such a species or "qu'il sera toujours impossible d'identifier" as Simon (1910) stated.

The second record was that of Forskål (1775), who described four spider species from the region of Cairo : *Aranea citricola*, *A.insidiatrix*, *A.rivulata* and *A.trifasciata*. His descriptions were more detailed and, at least, enough for identification. His work was published after his death by Carsten Niebuhr in Copenhagen.

The third work and the real scientific study of arachnida of Egypt began with the "*Description de l'Égypte*". In this historical work, we can find the first landmark in the study of Arachnida of Egypt. It includes the work of Savigny on Egyptian arachnids, completed and edited by Audouin. The story of this work was summarized by Simon (1910):

In 1798, J.-C. Savigny, attached as a zoologist to the great French expedition to Egypt, worked on the magnificent drawings of the nine plates of Arachnids, of which the engraving, entrusted to the best artists of his time, were accomplished about 1811.

The publication was adjourned, nobody knew why, and the author became completely blind in 1824, the editing of the text was entrusted to Victor Audouin.

The 1st edition in-4° is a gathering of memoirs on diverse subjects of natural history, under the general title of *Description de l'Égypte ou Recueil des observations et des recherches qui ont été faites en Égypte pendant l'Expédition de l'armée française. Histoire naturelle, t. I, 1809*, a date which may deceive because all the memoirs which compose this volume were not published simultaneously; the part of Arachnids, which is incorporated in no. 4, p. 99, under the title : *Explication sommaire des planches d'Arachnides de l'Égypte et de la Syrie, publiée par Jules-César Savigny, membre de l'Institut; offrant un exposé des caractères naturels des genres, avec la distinction des espèces, par Victor Audouin*, is very subsequent, because Audouin had not been charged by editing until 1825, as proved by a ministerial letter inserted in the same book, p. 5, and beared the date 19 March 1825.

The 2nd edition in-8°, in 24 volumes, had been published few years later; volume 22, relating to natural history, beared the date of 1827, this last edition, was the only cited by Walckenaer and all the authors who followed him, nevertheless it was a literal reprint of the first under another format.

The share of Audouin in editing the text appears very minute, due to a note in the 1st edition: «M. Audouin se fait un devoir de déclarer qu'il a mis à profit la description des Arachnides commencée par M. Savigny, mais dont ce savant n'avait pu revoir les épreuves. Cette description, qui s'arrête à la pl. IV, a été souvent restreinte afin d'être mise en rapport avec l'explication sommaire des Mollusques, Annélides, Crustacés, etc.»

Indeed, the explanations relating to the 42 figures of plates I to IV were accompanied by summarized descriptions, and indications to localities and habitats, certainly by the hand of Savigny, while for the other plates, these indications defaulted and the descriptions, in all cases were reduced to minimum, sometimes also missing, notably for the Salticids.

The two authors : Savigny and Audouin

The life of the two authors of this work can be summarized from Pallary (1926), in his "Notice Biographique Sur J.C.Savigny", pp.1-6, as:

Marie-Jules-César-Lelorgne de Savigny was born at Provins in 5 April 1777. He was son and grandson of judges, and his mother belonged to a rich noble family. He departed to Egypt because Rouen lorsque Cuvier proposed him to make a trip for the commission which Bonaparte proposed to be incorporated in the expeditionary corps of Egypt (1798), with Geoffroy Saint-Hilaire as colleague for natural history. He was nominated as a member of the Institut (Académie des Sciences) in 1821.

Unfortunately during his stay in Egypt, Savigny contracted an illness of eyes which, under the influence of tiredness occasioned by the examination of the microscopic creatures which he studied, evolved rapidly and turned, in 1824, to complete blindness. A nervous illness also came, alas! to increase his state and to render all his intellectual work impossible, then he could not publish the text which must accompany his plates. Savigny died in 5 October and buried in 14 October 1851.

Victor Audouin, was born in 1797, distinguished naturalist, founder of the *Annales des sciences naturelles* and the Entomological Society. After having been deputy of Lamarck in the Museum, he was nominated as professor of entomology, instead of Latreille, who died in 1823. He had important observations on crustacea, silkworms, pyralid moths of vine, and *Histoire naturelle du littoral de la France*, in collaboration with Milne Edwards. Audouin had admired by the Academy of Sciences in 1838 and died early in the age of 44 (in 1841).

The problem of the authorship and the date of publication

Sherborn (1897) depended mainly on : (1) Engelmann, *Bibl.Hist.Nat.* p.340 and (2) *Ann.Soc.Entom.France*, xi., 1842, p.99, to state : "I have no doubt myself that all the parts enumerated above (vol. I., parts 1-4) may be safely regarded as dated 1826."

Tollitt (1986) followed the guidelines of Sherborn and stated : "In general, most workers tend to cite Audouin alone as the author of *Explication sommaire des planches*, probably as a result of Sherborn's original paper. Thus, in following Sherborn's analysis, the author and date of volume 1, part 4, *Explication sommaire des planches* may be cited as J. V. Audouin, [1826]."

Both Sherborn and Tollitt attributed volume 1, part 4 "solely to Jean Victor Audouin as he apparently had to begin the work again from the

beginning, because Savigny did not pass any of his manuscripts on to him after he went blind."

Two examples of the scientists who accepted "Audouin, 1826" are : Millidge (1988) following Tollitt and Baehr & Baehr (1995) following Sherborn.

Date of publication

The cover of the first edition of *Histoire Naturelle*, t.I carried the date M.DCCC.IX. (1809). This date is "Date incorrect" (ICZN, Art.21 d - I.U.B.S., 1985) as explained by Simon (1910). There is an evidence at the end of the *Note concernant l'Explication Sommaire des Planches dont les dessins ont été fournis par M. J.C.Savigny, pour l'Histoire Naturelle de l'ouvrage*. p.6 (Anonymous, 1825), as following :

Note

Distribution des planches de Zoologie dont les dessins ont été fournis par M. Savigny N.B. L'Histoire Naturelle de l'ouvrage et terminée par la Botanique, soixante-deux planches, et par la Minéralogie, quinze planches, formant la seconde partie du 2.e volume.

Paris, le 1.er novembre 1825.

Signé Lafont, Président; Girard, Fourier, Desgenettes, Geoffroy-Saint-Hilaire, Devilliers, Jollois, Le Père, Jomard.

Hence, the year of publication is 1825, depending on this evidence printed inside the work itself.

Authorship

There are two footnotes in p.99 (the first page of *Explication sommaire des planches d'Arachnides de l'Égypte et de la Syrie*) :

(1) M. Savigny observe que les dessins des Arachnides, exécutés sous ses yeux et dans son cabinet par MM. Meunier, Huet et Prêtre, ont été commencés en 1804, et qu'ils étoient tous terminés et donnés à la gravure en 1812. C'est pour ce motif que toutes les planches, même celles qui ont été terminées dans ces derniers temps, porteront cette date. Nous insistons sur cette déclaration, afin qu'on ne suppose pas que les travaux de M. Savigny ont pu être modifiés par des découvertes assez importantes dont la science s'est enrichie depuis peu, et qui n'avoient pas échappé à la sagacité de notre auteur : telle est, entre autres, l'observation curieuse de M. Treviranus, qui a démontré que les pièces situées à l'extrémité des palpes du mâle n'étoient autre chose qu'un appareil d'excitation, et que les organes propres à ce sexe existoient au-dessous du premier segment de l'abdomen, c'est-à-dire, à la même place que dans la femelle. Notre savant ami M. Savigny avoit remarqué ce fait avant l'anatomiste allemand.

(2) Voyez ci-dessus, page 3, la *Note concernant L'Explication sommaire des planches dont les dessins ont été fournis par M. J. C. Savigny*, pour L'Histoire Naturelle de L'Ouvrage. M. Audouin se fait un devoir de déclarer qu'il a mis à profit la description des Arachnides commencée par M. Savigny, mais dont ce savant n'avoit pu revoir aucune épreuve. Cette description, qui s'arrête à la planche 4, a été souvent restreinte et modifiée, afin d'être mise en rapport avec L'Explication sommaire des Mollusques, Annelides, Crustacés, &c.

They elucidate the role of Savigny and that he described the specimens figured in plates 1-4, and stopped because of blindness. Then, Audouin completed the work after being ordered by Son Exc.le Ministre Secrétaire d'état au département de l'intérieur, as stated in the note mentioned above (p.3) : Déterminé par ces diverses considérations, le Ministre a écrit à la Commission d'Égypte, en même temps qu'à M. Savigny, qu'il chargeoit M. Audouin, naturaliste et son élève, de mettre ces planches en état de paroître, en y inscrivant les noms généraux et toutes les désignations nécessaires, et en rédigeant une explication très-sommaire, suffisante pour l'intelligence des figures; mais en même temps Son Excellence a réservé à M. Savigny tous ses droits comme auteur; son intention étant que les explications fournies par M. Audouin ne puissent nuire aux travaux scientifiques du premier, et qu'elles se rapportent constamment aux parties déjà faites, de manière que M. Savigny puisse un jour donner à ses recherches la suite qu'il jugera convenable.

Simon (1910) also noticed that the description of specimens are accompanied by localities, only in 42 figures (in pl.1-4, except the last two specimens in pl.4). I think that Savigny depended on his notices or his memory to remember the locality of every specimen figured to state its locality, where the specimen was collected. After being blind, it was impossible to him to remember the locality of any figured specimen. It was not possible too, to know the relation between any of Savigny's written notices and any specimen figure to be of use to Audouin.

Therefore, it is evident that Savigny is responsible for the description of the specimens figured in plates 1-4, which are accompanied by localities, except the last two specimens in pl.4 (42 figures). Savigny is responsible too for the names of new species and genera included in the text (pp.106-150). While Audouin is responsible for the names of new species included in the text (pp.151-186) (70 figures).

In addition, there are only 6 new valid genera of spiders in this work. They are : *Nemesia*, *Ariadna*, *Hersilia*, *Erigone*, *Argiope*, and *Ocyale*. All of them are described in the section of Savigny (pl.1-4). Also, Savigny's descriptions are twice longer than those of Audouin.

The Arachnid species published in "*Description de l'Égypte*"

The nine plates of Arachnida includes 112 figures. Seven plates were devoted to spiders : 89 figures (81 species of 30 genera classified in 20 groups) = 71 species + 6 synonyms + 5 nomina dubia (in the most recent classification).

Plate 8 : figs. 1-3 scorpions : 3 species of *Scorpio* = 3 species;

figs. 4-6 pseudoscorpions : 3 species of *Chelifer* = 2 species + 1 n.d.;

figs. 7-10 solpugids : 4 species of *Solpuga* = 3 species + 1 syn.

Plate 9 : figs. 1-3 opilionids : 3 species of *Phalangium* = 1 sp. + 2 n.d.;
figs. 4-13 acarids : 10 species of 3 genera = 6(+2) spp. + 1 syn. + 1 n.d.

Every figure group of a species includes a habitus drawing and minor details drawings.

In the following table : 1) all the arachnid species described in "*Description de l'Égypte. Histoire naturelle, t. I, p. 4*" are mentioned, noting 2) the sex of the specimen figured, with 3) number of pages in both the first (1825) and the second (1827) editions, 4) the locality of the first 42 figured specimens, and 5) the valid name currently used.

All species names are revisioned and synonymized according to :
Order Araneida (El-Hennawy, 1990; Platnick, 1993 & 1997), Order Scorpionida (El-Hennawy, 1992), Order Pseudoscorpionida (Harvey, 1990), Order Solpugida (El-Hennawy, 1998), Order Opiliona Cokendolpher, 1990), Order Acarida (Nuttall, *et.al.*, 1908).

A note on the misspellings in the second edition is provided. The drawing of the male palpal organ in spiders is noted in 21 species (see footnote (1) above in "Authorship" section). Also, all male solpugid species figured are accompanied by flagellum drawing. It was a great addition in the time of Savigny.

The locality was mentioned for the first 42 figured specimens [40 species (now 37), Egypt 36 (33), Palestine 5]. There were 7 localities in Egypt : Alexandrie (15 species), Rosette (11), Kaire (8), Damiette (2), Menzaleh (2), Sâlahyeh (1), Delta (1); and 3 localities in Palestine : Acre (3), Carmel (1), Jaffa (1).

There are 3 figures which were described as male spiders while they were subadult or juvenile as shown in the figure. They are :

Pl. 2 fig. 5 *Argyope aurelia*, subadult male.

Pl. 4 fig. 12 *Eresus Dufourii*, juvenile.

Pl. 6 fig. 11 *Thomisus hirtus* ?, subadult male.

Note 1 : Planche 1-7, 9 Dessiné et gravé en 1805-12; pl. 8 en 1806-11.

2 : In Edit. II (1827) p.328 the currently used spelling *Argiope* is used once instead of *Argyope*.

Acknowledgments

I am grateful to Dr. J.Gruber (Vienna) and Dr. M.Fouda (Cairo) for the photocopies of the papers of Sherborn (1897) and Tollitt (1986) respectively.

Table of Arachnid species published in "Description de l'Égypte"

Plate 1

Fig.	Species	♂♀	Edit. I	Edit. II	Locality	Valid Name
1	<i>Nemesia cellicola</i> Sav.	♀	107-108	304-305	Des environs d'Alexandrie	<i>Nemesia cellicola</i> Savigny, 1825
2	<i>Segestria perfida</i> Walck. *	♂♀	108-109	306-307	De l'intérieur des maisons et des caves d'Alexandrie	<i>Segestria florentina</i> (Rossi, 1790)
3	<i>Ariadna insidiatrix</i>	♀	109-110	308-309	De l'intérieur des maisons d'Alexandrie	<i>Ariadna insidiatrix</i> Savigny, 1825
4	<i>Lachesis perversa</i> *	♂	111	311-312	Des environs du Kaire	<i>Lachesana perversa</i> (Savigny, 1825)
5	<i>Tegenaria domestica</i> Walck.	♀	112-113	312-314	Des maisons d'Alexandrie	<i>Tegenaria parietina</i> (Fourcroy, 1785)
6	<i>Arachne familiaris</i>	♀	113-114	315-316	Des maisons de Rosette	<i>Tegenaria domestica</i> (Clerck, 1757)
7	<i>Arachne timida</i> *	♂	114	316	Des jardins de Rosette	<i>Agelena timida</i> (nomen dubium)
8	<i>Hersilia caudata</i>	♀	115	318	Des environs du Kaire	<i>Hersilia caudata</i> Savigny, 1825
9	<i>Erigone vagans</i>	♂	116-117	320-321	Des jardins du Kaire	<i>Prinerigone vagans</i> (Savigny, 1825)

Plate 2

1	<i>Uloborus flavus</i> Sav.	♀	117-118	322-323	Des environs de Rosette et des jardins du Kaire	<i>Tetragnatha flava</i> (Savigny, 1825)
2	<i>Eugnatha nitens</i>	♀	118-119	323-325	Des environs de Rosette	<i>Tetragnatha nitens</i> (Savigny, 1825)
3	<i>Eugnatha pelusia</i> *	♂♀	119-120	325-327	De l'île de Rosette et des îlots du lac Menzaleh	<i>Tetragnatha nitens</i> (Savigny, 1825)
4	<i>Eugnatha filiformis</i>	♀	120-121	327	De l'intérieur du Delta	<i>Tetragnatha filiformis</i> (Savigny, 1825)
5	<i>Argiope aurelia</i>	♂♀	122-124	331-334	Des environs du Kaire et des environs d'Alexandrie	<i>Argiope trifasciata</i> (Forskål, 1775)

6	<i>Argiope sericea</i>	♀	124-125	334-335	Des environs du Kaire et des environs d'Alexandrie	<i>Argiope lobata</i> (Pallas, 1772)
7	<i>Argiope splendida</i>	♀	125-126	335-336	Des environs d'Acre	<i>Argiope lobata</i> (Pallas, 1772)
8	<i>Epeira armida</i>	♀	126-127	337-338	Des environs d'Acre	<i>Aculepeira armida</i> (Savigny, 1825)
9	<i>Epeira circe</i>	♀	127-128	338-339	De l'intérieur des maisons d'Alexandrie	<i>Araneus circe</i> (Savigny, 1825)
10	<i>Epeira apoclista</i> Walck.	s♂♀	128-129	339-341	Des bords du Nil, aux environs de Rosette et de l'île de Rosette	<i>Larinioides cornutus</i> (Clerck, 1757)

Plate 3

1, 2	<i>Epeira apoclista</i> *	♂	130-132	341-344	De l'île de Rosette	<i>Larinioides folium</i> (Schrank, 1803)
3	<i>Epeira umbratica</i>	♂	132	345	Des environs de Damiette	<i>Nuctenea umbratica</i> (Clerck, 1757)
4	<i>Epeira lucina</i>	♀	132-133	345-347	De l'île de Rosette	<i>Singa lucina</i> (Savigny, 1825)
5	<i>Epeira chloris</i>	♂	133	347	Des environs d'Acre	<i>Larinia chloris</i> (Savigny, 1825)
6	<i>Clotho Durandii</i> Walck.	♀	134-135	348-349	Du mont Carmel	<i>Uroctea durandi</i> (Latreille, 1809)
7	<i>Enyo nitida</i>	♀	135-136	350-351	Des environs d'Alexandrie	<i>Zodarion nitidum</i> (Savigny, 1825)
8	<i>Enyo longipes</i> *	♂	136	351-352	Des environs du Kaire	<i>Zodarion nitidum</i> (Savigny, 1825)
9	<i>Latrodectus erebus</i>	♀	137	352-353	Des environs de Sâlahyeh	<i>Latrodectus tredecimguttatus</i> (Rossi, 1790)
10	<i>Latrodectus argus</i>	♀	137-138	353-354	Des environs d'Alexandrie	<i>Latrodectus tredecimguttatus</i> (Rossi, 1790)
11	<i>Latrodectus venator</i>	♀	138	354-355	Des environs d'Alexandrie	<i>Steatoda venator</i> (Savigny, 1825)

12	<i>Pholcus rivulatus</i> *	♂	140-141	358-359	Dans l'intérieur des maisons du Kaire	<i>Holocnemus pluchei</i> (Scopoli, 1763)
13	<i>Pholcus phalangioides</i> Walck. *	♂♀	141-142	360	Dans l'intérieur d'une maison d'Alexandrie	<i>Pholcus phalangioides</i> (Fuesslin, 1775)

Plate 4

1	<i>Sphasus alexandrinus</i>	♀	142-143	361-362	Du désert aux environs d'Alexandrie	<i>Oxyopes heterophthalmus</i> (Latreille, 1804)
2	<i>Lycosa tarentulina</i> *	♂♀	143-145	363-367	Des environs d'Alexandrie	<i>Allocosa tarentulina</i> (Savigny, 1825)
3	<i>Lycosa arenaria</i>	♀	146	367-368	Du désert aux environs de Rosette	<i>Evippa arenaria</i> (Savigny, 1825)
4	<i>Lycosa peregrina</i>	♀	146	368	Des environs de Rosette	<i>Lycorma peregrina</i> (Savigny, 1825)
5	<i>Lycosa pelliona</i>	♀	146-147	368-369	Des environs de Rosette	<i>Ocyale pelliona</i> (Savigny, 1825)
6	<i>Lycosa agretyca</i> Latr.	♀	147	369	Des rives du canal d'Alexandrie	<i>Geolycosa urbana</i> (Cambridge, 1876)
7	<i>Lycosa Nilotica</i>	♀	147-148	369-370	Des rives du canal d'Alexandrie	<i>Lycosa nilotica</i> Savigny, 1825
8	<i>Lycosa pelusiaca</i>	♀	148	370	Des bords du lac Menzaleh	<i>Alopecosella pelusiaca</i> (Savigny, 1825)
9	<i>Dolomede hippomene</i> ¹	♀	148-149	371	Des environs de Damiette	<i>Dolomedes hyppomene</i> Savigny, 1825
10	<i>Ocyale atalanta</i>	♀	150	374	Des environs de Jaffa	<i>Ocyale atalanta</i> Savigny, 1825
11	<i>Eresus Petagnae</i>	♀	151	375-376	---	<i>Eresus petagnae</i> Audouin, 1825
12	<i>Eresus Dufourii</i>	o	151-152	376-377	---	<i>Stegodyphus dufouri</i> (Audouin, 1825)

Plate 5

Fig.	Species	♂♀	Edit. I	Edit. II	Valid Name
1	<i>Scytodes thoracica</i> Latr.	♀	152-153	378-379	<i>Scytodes thoracica</i> (Latreille, 1802)
2	<i>Scytodes rufescens</i> Duf.	♀	153-154	379-380	<i>Loxosceles rufescens</i> (Dufour, 1820)
3	<i>Dysdera erythrina</i> Latr.	♀	154	380-381	<i>Dysdera erythrina</i> (Walckenaer, 1802)
4	<i>Drassus Listeri</i>	♀	155	382-383	<i>Zelotes listeri</i> (Audouin, 1825)
5	<i>Drassus Schaefferi</i> ²	♀	156	383	<i>Pterotricha schaefferi</i> (Audouin, 1825)
6	<i>Drassus Lyonnetii</i> *	♂	156	383-384	<i>Trachyzelotes lyonneti</i> (Audouin, 1825)
7	<i>Drassus Linnaei</i>	♀	156	384	<i>Pterotricha linnaei</i> (Audouin, 1825)
8	<i>Clubiona Albini</i>	♀	157	385-386	<i>Aphantaulax albini</i> (Audouin, 1825)
9	<i>Clubiona Listeri</i>	♀	157-158	386-387	? (nomen dubium)
10	<i>Philodromus Clerckii</i>	♀	159	388-389	? (nomen dubium)

Plate 6

1	<i>Philodromus Walckenaërii</i> ³	♀	159-160	390	<i>Eusparassus walckenaeri</i> (Audouin, 1825)
2	<i>Philodromus Linnaei</i> *	♂	160-161	390-391	<i>Eusparassus walckenaeri</i> (Audouin, 1825)
3	<i>Philodromus Fabricii</i> *	♂	161	392	<i>Thanatus fabricii</i> (Audouin, 1825)
4	<i>Philodromus Albini</i> *	♂	161	392	<i>Thanatus albini</i> (Audouin, 1825)
5	<i>Philodromus rhombiferens</i> Walck.	♀	161-162	392-393	<i>Thanatus formicinus</i> (Clerck, 1757)
6	<i>Selenops Ægyptiaca</i>	♀	162-163	394-395	<i>Selenops radiatus</i> Latreille, 1819
7, 8	<i>Thomisus Peronii</i>	♀	163	395-396	<i>Thomisus onustus</i> Walckenaer, 1805
9	<i>Thomisus Martyni</i> *	♂♀	163-164	396	<i>Pistius truncatus</i> (Pallas, 1772)
10	<i>Thomisus Buffonii</i> *	♂	164	396-397	<i>Heriaeus buffoni</i> (Audouin, 1825)
11	<i>Thomisus hirtus</i> ? Latr.	s♂♀	164-165	397-398	<i>Xysticus blieus</i> (Simon, 1875)
12	<i>Thomisus Lalandii</i> *	♂♀	165	398	<i>Xysticus lalandei</i> (Audouin, 1825)

13	<i>Thomisus Clerckii</i>	♀	165	398	<i>Xysticus clercki</i> (Audouin, 1825)
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Plate 7

1, 2	<i>Thomisus Diana</i> ? Walck.	♂	165-166	399	<i>Synema diana</i> (Audouin, 1825)
3, 4, 5	<i>Thomisus rotundatus</i> Walck. *	♂♀	166-167	399-401	<i>Synema globosum</i> (Fabricius, 1775)
6, 7	<i>Platyscelum Savignyi</i>	♂	167-168	402-403	<i>Palpimanus gibbulus</i> Dufour, 1820
8	<i>Attus Adansonii</i> *	♂	169	404-405	<i>Hasarius adansonii</i> (Audouin, 1825)
9	<i>Attus Dorthesii</i>	♀	170	405-406	<i>Aelurillus dorthesi</i> (Audouin, 1825)
10	<i>Attus Druryi</i>	♂	170	406	? (nomen dubium)
11	<i>Attus Frischii</i>	♀	170	406	<i>Pellenes frischii</i> (Audouin, 1825)
12	<i>Attus Gesneri</i>	♀	170	406	<i>Menemerus gesneri</i> (Audouin, 1825)
13	<i>Attus tardigradus</i> Walck.	♀	170	406-407	<i>Hasarius adansonii</i> (Audouin, 1825)
14	<i>Attus Bonnetii</i>	♀	170	407	<i>Mogrus bonneti</i> (Audouin, 1825)
15	<i>Attus cupreus</i> Walck. *	♂	171	407	<i>Heliophanus cupreus</i> (Walckenaer, 1802)
16	<i>Attus Mouffetii</i>	♀	171	407	? (nomen dubium)
17,18	<i>Attus Soldanii</i> *	♂♀	171	407-408	<i>Menemerus soldani</i> (Audouin, 1825)
19	<i>Attus Hunterii</i>	♀	171	408	<i>Menemerus hunteri</i> (Audouin, 1825)
20	<i>Attus Illigerii</i>	♀	172	408	<i>Menemerus illigeri</i> (Audouin, 1825)
21	<i>Attus Redii</i>	♂	172	408-409	<i>Langona redii</i> (Audouin, 1825)
22	<i>Attus Paykullii</i> *	♂	172	409	<i>Plexippus paykulli</i> (Audouin, 1825)

Plate 8

1	<i>Scorpio occitanus</i> ? Am.	♂	173	410-411	<i>Leiurus quinquestriatus</i> (Hemprich ♀ Ehrenberg, 1828)
2	<i>Scorpio Amoreuxii</i>	♀	173-174	411-412	<i>Androctonus amoreuxi</i> (Audouin, 1825)
3	<i>Scorpio australis</i> Herbst.		174	412	<i>Androctonus bicolor</i> Hemprich ♀ Ehrenberg, 1828

4	<i>Chelifer sesamoides</i>		174-175	413-414	<i>Chelifer cancroides</i> (Linnaeus, 1758)
5	<i>Chelifer Hermannii</i>		175	414	<i>Olpium savignyi</i> Simon, 1879 (nomen dubium)
6	<i>Chelifer Beauvoisii</i>		175	414	<i>Garypus beauvoisi</i> (Audouin, 1825)
7	<i>Solpuga araneoides</i> Olivier	♂♀	176-178	416-419	<i>Galeodes araneoides</i> (Pallas, 1772)
8	<i>Solpuga intrepida</i> Duf.	♂	178	419	<i>Galeodes araneoides</i> (Pallas, 1772)
9	<i>Solpuga melanus</i> Oliv.	♂♀	178-179	419-420	<i>Rhagodes melanus</i> (Olivier, 1807)
10	<i>Solpuga phalangium</i> Oliv.	♂	179	420	<i>Rhagoditta phalangium</i> (Olivier, 1807)

Plate 9

1	<i>Phalangium Ægyptiacum</i> Sav.	♂	180-181	422-424	<i>Phalangium aegyptiacum</i> Savigny, 1816 (nomen dubium ?)
2	<i>Phalangium Copticum</i> Sav. ⁴	♀	181-182	424	<i>Phalangium copticum</i> Savigny, 1816 (nomen dubium ?)
3	<i>Phalangium Savignyi</i>	♂	182	424	<i>Phalangium savignyi</i> Audouin, 1825
4	<i>Acarus Savignyi</i>	♂	182-183	425-426	?
5	<i>Argas Savignyi</i>		183-184	426-427	<i>Ornithodoros savignyi</i> (Audouin, 1825)
6	<i>Argas Fischeri</i>		184	427-428	<i>Argas vespertilionis</i> (Latreille, 1796)
7	<i>Argas Hermannii</i>		184	428	<i>Argas hermanni</i> Audouin, 1825
8	<i>Argas persicus</i> Fisch. ⁵		184	428	<i>Argas persicus</i> (Oken, 1818)
9	<i>Ixodes Leachii</i>		185	428	<i>Haemaphysalis leachi</i> (Audouin, 1825)
10	<i>Ixodes Ægyptius</i> Latr.		185	428-429	<i>Hyalomma aegyptium</i> (Linnaeus, 1758)
11	<i>Ixodes Fabricii</i>		186	429	<i>Hyalomma aegyptium</i> (Linnaeus, 1758)
12	<i>Ixodes Linnaei</i>		186	429	<i>Rhipicephalus</i> sp. ?
13	<i>Ixodes Forskaelii</i>		186	430	<i>Argas</i> sp. ?

In "Edit. II" : 1. *Dolomedes hyppomene*. 2. *Drassus Scaefferi*. 3. *Philodromus Walckenaerii*. 4. *Phalangium qobticum*. 5. *Argas Persicus*.

* With drawing of male palpal organ.

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